Bluetooth/RS-232 Enhanced Data Communication

ZOLL M Series

9650-0307-01 Rev. B

The issue date or revision level for this operation guide is shown on the front cover.
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Product Description

The ZOLL M Series Enhanced Data Communication option uses Bluetooth® wireless technology to communicate with a ZOLL-approved, Bluetooth-equipped handheld device (or PC) running ZOLL Interlink™ data management software. The M Series unit also provides serial communication capability through an RS-232 serial port.

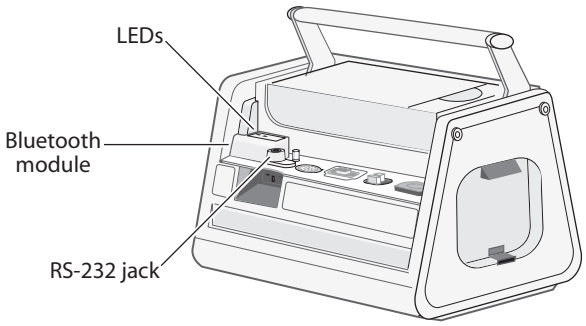
With the Enhanced Data Communication option, you can transmit 12 Lead ECG data, trend data, and information stored on an M Series-installed PC data card to a remote device running ZOLL Interlink software. The remote device in turn sends the data to a ZOLL Data Control (ZDC) Director™ station for appropriate processing and formatting.

ZOLL Interlink software must be installed on the remote handheld device to access any data transmitted from the M Series unit. Refer to the ZOLL Interlink user documentation for installation and operating instructions.

Bluetooth module

The Bluetooth module contains a modem for wireless data transmission as well as an RS-232 jack for serial data transmission, and resides on the back of the M Series unit. For data transmission through the RS-232 jack, you must use a ZOLL M Series RS-232 data transfer cable (ZOLL part number 8000-0605-01) and a serial data cable that is compatible with the remote handheld device.

Figure 1: M Series with Bluetooth module



The Bluetooth module has two LEDs that indicate power (green) and module activity (blue) respectively.

LED Activity	Condition
Solid green	M Series unit is supplying power to the module.
Flashing blue (steady)	Bluetooth module is negotiating connection with a receiver.
Solid blue	Bluetooth module is connected to a receiver.
Flashing blue (intermittent)	Bluetooth module is transmitting data to a receiver.

Note: When the blue LED illuminates to indicate Bluetooth module activity, the green power LED goes off.

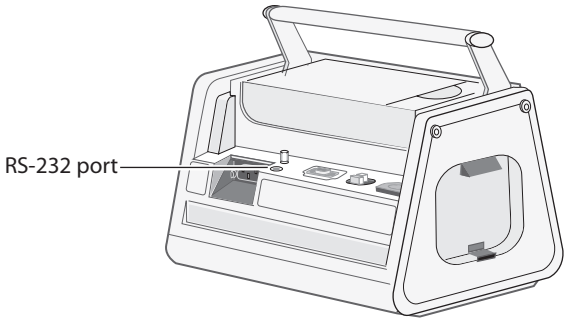
Caution If you remove the Bluetooth module from the unit, you MUST disconnect the main power source (AC or DC) and remove the battery from the unit first. Failure to do so will overload the internal fuse and the unit will have to be returned for service.

RS-232 serial port

On M Series units not equipped with a Bluetooth module, the RS-232 port on the back of the unit provides serial communications capability to the remote handheld device or PC.

Caution The RS-232 serial port does not function on an M Series unit that is equipped with a Bluetooth module; you must use the RS-232 jack on the Bluetooth module for serial data communications. If you remove the Bluetooth module from the unit, the RS-232 port is disabled. The ECG output connector, however, remains operational in the absence of the Bluetooth module.

Figure 2: M Series unit with RS-232 serial port



For data transmission through the RS-232 serial port, you must use a ZOLL M Series RS-232 data transfer cable (ZOLL part number 8000-0605-01) and a serial data cable that is compatible with the remote handheld device.

The M Series data transfer cable terminates in a female DB9 connector; the serial data cable that connects to the remote handheld device must terminate in a male DB9 connector. You may also need a null modem adapter to connect the two cables; see the ZOLL Interlink user documentation for more information.

Communication Settings

You must configure the same communication settings on both the M Series unit and the remote handheld device for proper data transmission. The remote handheld device may also require a PIN code to connect to the M Series unit: in this event, use the default value of 0.

Parameter	Value
Baud rate (bits per second)	115 200 bps 38 400 bps (default) 9600 bps
Data bits	8
Parity	None
Stop bits	1
Flow control	None

The remote handheld device must be running ZOLL Interlink software to access any information transmitted from the M Series unit. See the ZOLL Interlink user documentation for installation and operating instructions.

Note: If you are transmitting data through the Bluetooth module and then change to serial data transmission, you must cycle the power on the Bluetooth module (by pressing the **Realtime Start** and **Realtime Stop** softkeys) before connecting the data transfer cable. Failure to do so will result in a SERIAL FAULT error on the first attempt at serial data transmission.

Data Transmission

You can set the M Series unit to transmit 12 Lead ECG and trend data automatically, as soon as it is acquired, if the unit can establish a connection to the remote handheld device. You can also initiate transmission of patient data manually.

In System Utilities mode, you can initiate transmission of all trend history data or all information stored on a PC data card.

The "Trending" option must be enabled for trend data collection and transmission. See the *M Series Configuration Guide* for more information on setting this option.

Activating Automatic Data Transmission

If set for automatic data transmission (Realtime mode), the M Series unit displays two asterisks (*) in the top left-hand corner of the screen. When the unit is transmitting trend data or a 12 Lead patient record, the asterisks flash alternately; otherwise the asterisks remain static.

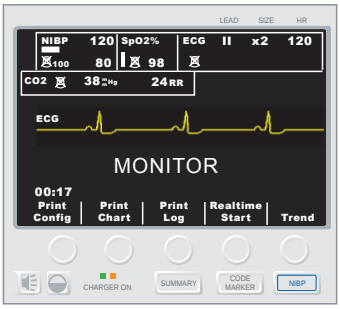
In Realtime mode, the M Series unit only transmits trend data collected since the unit was powered-up, and does NOT transmit all trend data stored in memory. For details on transmitting all trend data, see "Transmitting Trend History or PC Card Data" on page 6.

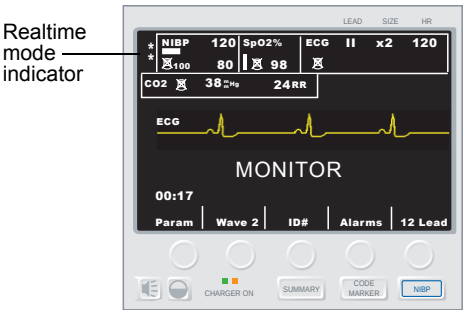
In Realtime mode, the M Series unit transmits 12 Lead data to the remote handheld device automatically. However, if the "Auto Transmit after 12 Lead Analysis" option is enabled, the M Series unit displays the Transmission Setup screen after the 12 Lead data has been acquired. If you press the **Dial Phone#** softkey, the unit transmits the 12 Lead data again; press the **Cancel Xmit** softkey to prevent redundant data transmissions and return to the 12 Lead menu.

If you are using Bluetooth communication on a regular basis, you can disable the "Auto Transmit after 12 Lead Analysis" option to eliminate the additional Transmission Setup screen; see the *M Series Configuration Guide* for information.

Procedure

Follow these steps to activate automatic data transmission on the M Series unit.

Step	Action	Result
1.	With the M Series unit in Monitor mode (ON for AED units), press the **SUMMARY** button on the M Series front panel.	The M Series unit displays the Summary menu. 

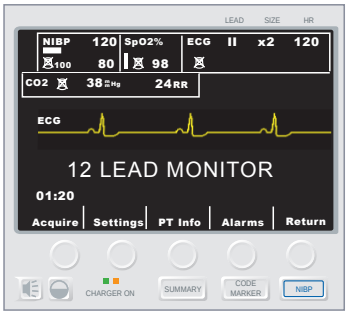
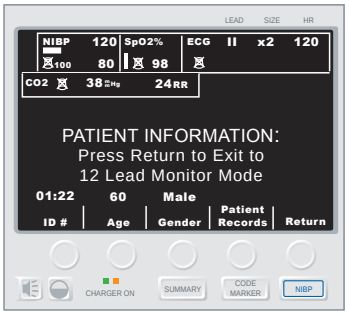
Step	Action	Result
2.	Press the **Realtime Start** softkey.	The M Series unit activates automatic transmission and displays the Realtime mode indicator in the upper left hand corner of the screen.  The Bluetooth module's green power LED illuminates. The M Series Bluetooth module can now establish a connection to the remote handheld device, and will automatically transmit 12 Lead ECG and trend data.

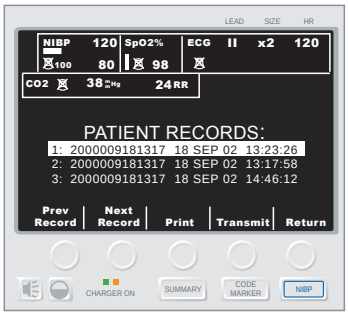
Transmitting 12 Lead ECG Patient Records

You can transmit 12 Lead ECG patient records to a remote handheld device running ZOLL Interlink software without placing the M Series unit into Realtime mode.

Procedure

Follow these steps to transmit patient record data to a remote handheld device.

Step	Action	Result
1.	With the M Series unit in Monitor mode (ON for AED units), press the **12 Lead** softkey.	The M Series unit displays the 12 Lead menu. 
2.	Press the **PT Info** softkey.	The M Series unit displays the Patient Information menu. 

Step	Action	Result
3.	Press the **Patient Records** softkey.	The M Series unit displays the Patient Records menu. 
4.	Select a Patient Record and press the **Transmit** softkey.	The M Series unit displays the Transmission Setup screen.
5.	Select the Interlink option and press the **Dial Phone#** softkey.	The Bluetooth module's green power LED illuminates. The M Series unit establishes a connection to the remote handheld device, and transmits the patient record data.

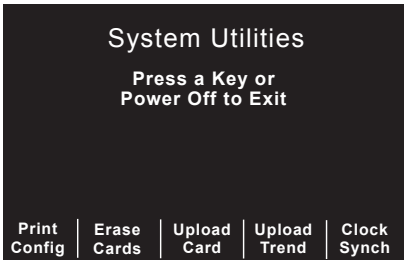
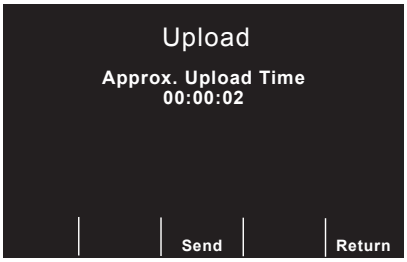
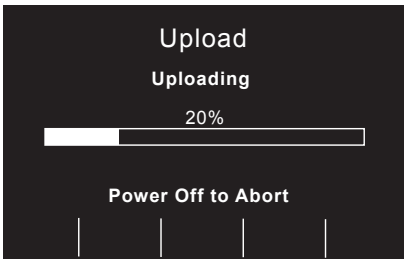
Transmitting Trend History or PC Card Data

You can transmit all trend history data stored in memory or all data stored on a PC data card to a remote handheld device from System Utilities mode.

For detailed instructions on uploading data from a PC data card through an RS-232 serial link, see "Appendix B" of the *M Series Operator's Guide*.

Procedure

Follow these steps to initiate trend history or PC card data transmission via the Bluetooth module to the remote handheld device.

Step	Action	Result
1.	Turn the selector switch to OFF. After 10 seconds, press and hold the left-most softkey and turn the selector switch to **MONITOR** (**ON** for AED units).	The M Series unit powers on in System Utilities mode. 
2.	Press the **Upload Trend** or **Upload Card** softkey.	The M Series unit displays the Upload screen. 
3.	Press the **Send** softkey.	The Bluetooth module's green power LED illuminates. The M Series unit establishes a connection to the remote handheld device, and begins data transmission. The unit displays a progress bar on the Upload screen. 

Troubleshooting

The M Series unit displays certain error messages to alert the user to problems detected in data transmission to the remote handheld device.

For further assistance, contact ZOLL Technical Service at 1-800-348-9011 (in North America). International customers should call the nearest authorized ZOLL Medical Corporation distributor.

Table 1: Error Conditions

<table>
<tr><th>Message</th><th>Possible Causes</th><th>Corrective Action</th></tr>
<tr><td>HOST FAULT
UPLOAD ABORTED</td><td>Remote device aborted transmission.</td><td>Check the ZOLL Interlink program on the handheld device for the source of the error; retry.</td></tr>
<tr><td>SERIAL FAULT
UPLOAD ABORTED</td><td>M Series unit aborted transmission.
<table><tr><th>IF ...</th><th>THEN ...</th></tr><tr><td>No data was transmitted (green LED only)</td><td>Devices may be too far apart.</td></tr><tr><td>No data was transmitted (blue LED on)</td><td>Transmission settings may be mismatched.</td></tr><tr><td>Some data was transmitted (blue LED on)</td><td>There may be environmental interference.

Devices may be too far apart.</td></tr></table></td><td>Ensure remote device is on and ready to accept data; retry.

Move the remote device closer to the M Series unit and retry.

Check the communication settings on the M Series unit and the remote device to ensure they match.

Reduce the baud rate on the M Series unit and the remote device.

Move the remote device closer to the M Series unit and retry.</td></tr>
<tr><td>SERIAL FAULT</td><td>Data retrieval pre-empted by other M Series operations (such as alarm conditions or defibrillation activity); unit could not retrieve data from memory.</td><td>Wait for M Series events to clear and retry.</td></tr>
</table>